COLONY OF SINGAPORE

BOTANIC GARDENS DEPARTMENT
ANNUAL REPORT FOR 1949

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By
M. R. HENDERSON,
Assistant Director of Botanic Gardens, Singapore.

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INTRODUCTORY

THE history of the Botanic Gardens, Singapore, was briefly sketched in the 1948 report, and it is not necessary to repeat it here. It may, however, be of interest to recall that the present Gardens were established in 1859, and came under Government control in 1874. The first attempt to establish a Botanic Garden was made by Sir Stamford Raffles soon after the founding of Singapore, but this Garden, which was sited on the slopes of Fort Canning, was abandoned in 1829.

STAFF

The Director, Mr. R. E. Holttum, retired from Government service in September to take the Chair of Botany in the University of Malaya. Mr. Holttum joined the Department in 1922 as Assistant Director and became Director in 1925. In his new sphere of activities as Professor of Botany he will be in close contact with the Botanic Gardens, and this association, it is certain, will benefit both the University and the Gardens. Mr. M. R. Henderson, Assistant Director, acted as Director for the remainder of the year, and Mr. J. Sinclair, Curator of the Herbarium, as Assistant Director. Mr. J. W. Ewart, Assistant Curator, Gardens, who returned from leave in August, resumed duty as Agricultural Officer, Singapore, in addition to his own duties. Bajuri bin Sappan, formerly Storekeeper, was appointed Technical Assistant as from 1st October, 1949. Mohamed Nur bin Mohamed Ghous, Herbarium Assistant, was on pilgrimage leave from 16th June to 15th December, 1949.

The labour force averaged seventy-five in the Gardens and fifty-six in Government House Domain. Their health was good.

BOTANICAL WORK IN 1949

Work on the revision of the flora of Malaya proceeds steadily, but has been somewhat slowed down by the impossibility, or at least the inadvisability of undertaking field expeditions in the Federation. Those places which would be most profitable to visit seem also to be those most infested by bandits. The only collecting tour undertaken in the Federation was one to Maxwell's Hill, Taiping, by Mr. J. Sinclair in September. This is a *locus classicus* of Malayan botany, having been visited by many botanists during the past seventy or eighty years. But Mr. Sinclair found, as any botanist in Malaya will find who thoroughly explores even a small area of forest, that there is still something new to be recorded. Two ferns new to Malaya were found on Maxwell's Hill, as well as some other plants which had been previously known only from one collection from other localities. Mr. Sinclair, who has done a considerable amount of collecting in Singapore island during the year, demonstrated that even here, where the original vegetation of the area has almost disappeared, novelties can be discovered, and he has added a dozen or more plants to the flora of Singapore. Mr. Sinclair visited Kuching in February at the request of the Sarawak Government in order to examine and put into order the Herbarium of the Sarawak Museum, which had been neglected during the Japanese occupation, but which, fortunately, had suffered little damage during

that time. This Herbarium is a small one but it contains many important Bornean collections. During his visit Mr. Sinclair was enabled, through the courtesy of Mr. Tom Harrisson, Curator of the Sarawak Museum, to visit and make collections at Mount Santubong, Kampong Segu, the limestone hills near Bau, and at Buso.

Mr. M. R. Henderson began the study of the genus *Calophyllum* of the family Guttiferæ. This is a group of forest trees which are now providing a certain amount of commercial timber. They are, botanically, a difficult group, the Malayan species of which have never been properly understood. As a result their nomenclature is in confusion and must be straightened out as a preliminary to understanding what is available in the forest and what their distribution is. Mr. Henderson continued work on his popular account of the *Wild Flowers of Malaya*, the first part of which is now published.

Mr. Sinclair continued as far as possible with his revision of the *Annonaceæ*, but awaits material from Borneo and India which is being sent on loan from Kew and Dehra Dun. Loan material of this family has been sent by the Department of Agriculture, Thailand, and by the Sarawak Museum, and Mr. Sinclair took the opportunity, while on leave in India, to consult type material in the Herbarium of the Royal Botanic Gardens, Calcutta.

Dr. C. X. Furtado pursued his studies of several genera of palms and completed manuscript revisions of the genera Korthalsia, Plectocomia and Plectocomiopsis.

The artist was kept fully employed during the year, executing mostly line drawings for the illustration of various botanical manuscripts, and also coloured drawings of new hybrid orchids and other plants. Mrs. Kinloch Smith presented a further series of water colour drawings of plants cultivated in the Gardens. These are of outstanding merit, both technically and artistically.

The Herbarium

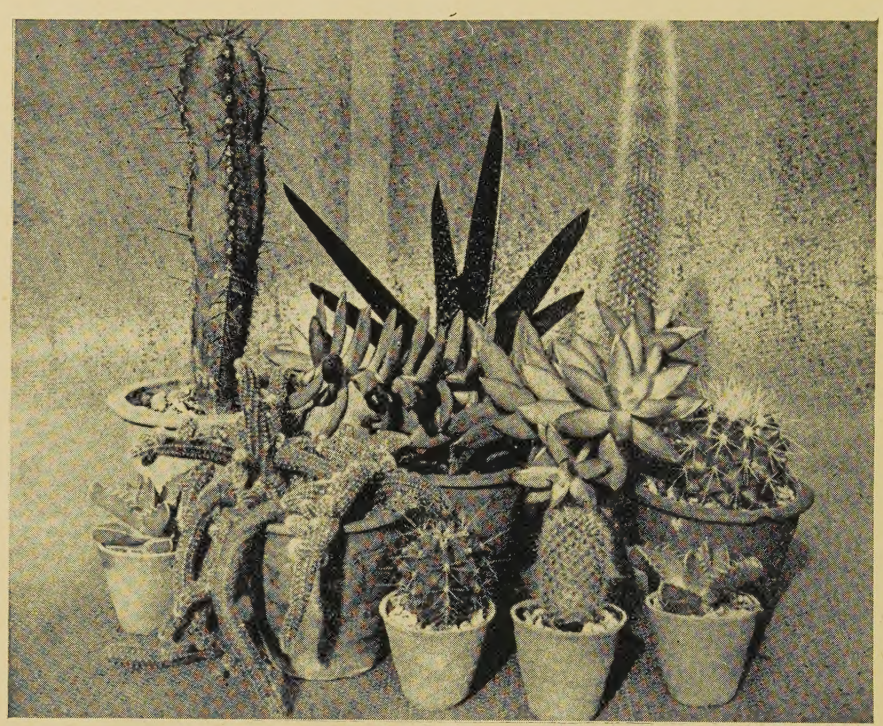
A considerable amount of time has been spent in getting together, listing and packing herbarium material for loan to various specialists, in particular to those botanists working for *Flora Malesiana*. 2,046 sheets were sent out on loan during the year, and in addition a large number of spirit specimens were sent to a specialist studying figs and fungi. The proper packing of such specimens is laborious and slow. These despatches interfered to some extent with the normal exchange of duplicate material, and although a considerable quantity was ready to be sent out, only 706 sheets could be sent. 1,601 duplicates were received from other institutions. 2,141 sheets were mounted and incorporated into the herbarium during the year, a smaller number than usual, as the mounters were engaged on a programme of repairing old herbarium sheets.

Eleven new sets of herbarium cases were purchased. These were filled by the overflow from the existing overcrowded cases, and as there is no room for further cases in the Herbarium building, extensions will be required in the near future.

Very considerable collections were received from the Forest Department, North Borneo, and Mr. Sinclair spent much time in naming those.

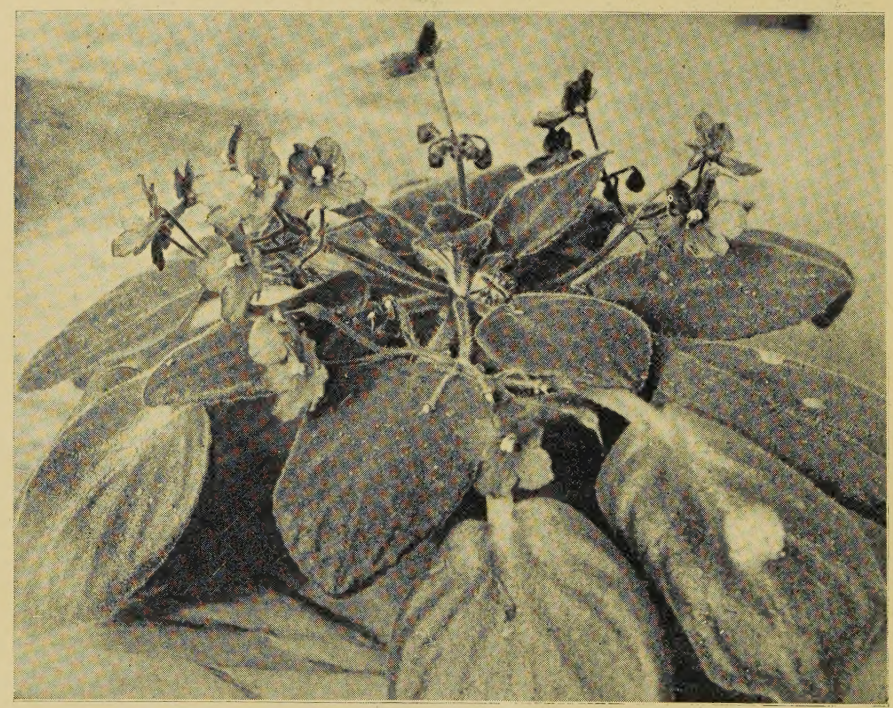
M. R. Henderson

The Sumatran Pine, *Pinus Merkusii*, on Lawn D.



G. H. Addison

A group of succulents raised from seed in Singapore.

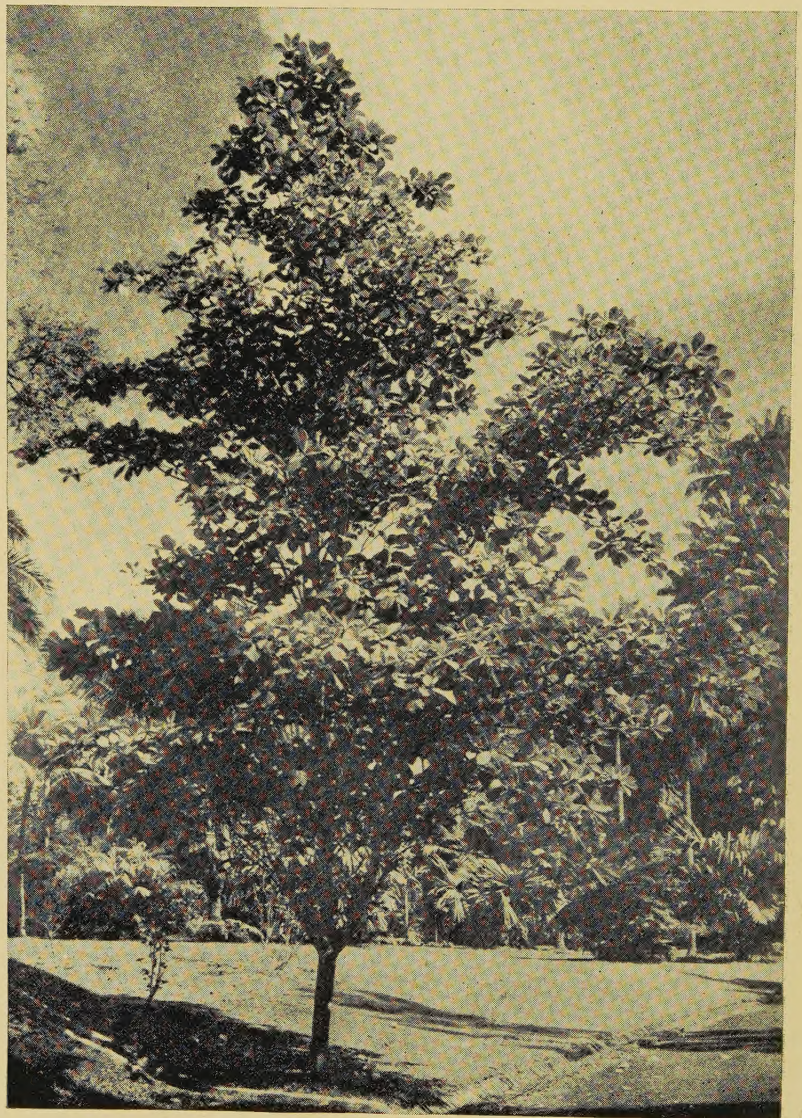


G. H. Addison

The African Violet (*Saintpaullia*).

M. R. Henderson

A Spathoglottis hybrid, Singapore Giant, grown as a bedding plant on Lawn O.



M. R. Henderson

A Malayan tree Gardenia, *Gardenia carinata,* by the Office.

Publications

Volume XII, part I, of the *Gardens' Bulletin* was published in April, consisting entirely of a critical revision of the genus *Eugenia* in Malaya by Mr. M. R. Henderson. Part 2 of this volume was published in December, and contains miscellaneous papers on Orchids, Ferns, Nomenclature, Palms, and a list of William Farquhar's Drawings of Malacca Plants, by Mr. R. E. Holttum, Dr. C. X. Furtado and Mr. I. H. Burkill.

The first two of what is hoped will be a series of small booklets, briefly describing and illustrating by means of line drawings, familiar garden plants, were placed on sale during the year. The first describes ten flowering trees, the second ten flowering shrubs. They are sold at fifty cents per copy.

Other work by the members of the Department published during the year included an important paper on the classification of Ferns in the *Biological Review* (Cambridge) by Mr. R. E. Holttum, and several papers, also by Mr. Holttum, on Malayan Orchids in *Chronica Naturæ*, *The Malayan Nature Journal*, and in the *Malayan Orchid Review*, the last named containing a most valuable list of orchid hybrids of the kinds which either are, or could be grown in Singapore. Nearly 400 hybrids appear in the list.

Dr. C. X. Furtado published a paper dealing with the nomenclature of a certain fern in *Lloydia* (America). The first part of Mr. Henderson's popular illustrated account of Malayan Wild Flowers was published by the Malayan Nature Society at the end of the year.

Roads, Buildings, etc

Those roads in the northern half of the Gardens which were in poor condition were made up and surfaced by the Public Works Department. A new access road to the Director's and Assistant Director's quarters was made from Tyersall Road. Vehicular traffic has been restricted to one entrance and to certain roads only in the south of the Gardens. It is believed that this is appreciated by the public, who are free to walk on most of the roads without interference from traffic, apart from numerous bicyclists, who obey no rules and are hard to check. It would probably enhance the amenities of the Gardens considerably to provide a suitable car park and to exclude all wheeled traffic (with the exception of perambulators) as is done in nearly all Botanic Gardens in other countries.

The large and small plant houses, which are used for the display of pot plants and orchids, were repainted and reroofed by the Public Works Department. It was pointed out in the 1948 report that the requirements of roofed houses for the propagation of seedlings, especially orchid seedlings, were still far short of our needs. This state of affairs continues. In 1947, in order to save those orchid seedlings which had survived the Japanese occupation and which were in great danger of being lost because of the dilapidated condition of the only two roofed houses, and to enable the continuation and expansion of the programme of orchid hybridisation, a temporary house was constructed by Gardens labour. This was roofed with a substance called "windolite", which is a sheet of cellulose acetate supported on fine wire mesh. This was used because it is very light and easily handled, but it does not resist the beating action of rain. When, after about nine months, it began to disintegrate and leak badly, it was replaced by corrugated aluminium sheet, light being admitted

by constructing a jack roof, which at first was "glazed" by old X-ray films, from which the emulsion had been removed, and later, when these had proved incapable of standing up to the weather, by glass. This house has proved suitable for orchid seedlings up to a certain stage. The aluminium sheet reflects most of the heat and of course is waterproof and drip proof. It is surprising how quickly drips from a badly made roof will kill seedlings and young plants. But such a house is not suitable for young orchid plants when they have become established and require plenty light, but at the same time protection from heavy rain. At present the only accommodation available is under the porch of the Director's house, a suitable place, but too small to allow of the proper conditions for the very large number of plants being raised. A large glass house is required.

A small glass house formerly erected in the large plant house as a shelter for succulents was removed and rebuilt in a sunny situation on Lawn X. More space is now required for succulents as well as for orchids, and this too must be glass roofed.

Horticultural Work: Botanic Gardens

A high standard of maintenance was reached during the year and most parts of the Gardens were as good as, if not better than they were in pre-war years. The Canna beds along Main Gate Road, which were replanted in 1948, made an exceptionally fine show almost throughout the whole of 1949, and there was no sign of the disease which destroyed them during the Japanese occupation.

Shell splinters damaged a number of trees in early 1942, and although most have either recovered or died, the effects are still being shown in some. Four or five *Eugenia grandis* had to be felled in the labourers' lines because of a rot which followed shell damage. Other losses were a fine old tree of *Eucalyptus corymbosa* on Lawn J and a massive, spreading *Xanthophyllum Curtisii* at the top of Maranta Avenue. The work of concentrating the bamboo collection on Lawn W has continued.

Some alterations were made in the bandstand area, chiefly the grassing over of a number of narrow pathways, which not only improves the appearance of the area by providing an unbroken sweep of lawn, but does away with the constant weeding and trimming of edges. The remainder of the silt from the lake, removed during 1948, was spread over Lawn F, and the area at the head of the lake was improved and planted with ferns and shade loving plants. These grew well but suffered damage by monkeys.

The Lawn Plans were kept up to date by the Horticultural Assistant, so that it is possible to locate any tree or shrub in the Gardens at a moment's notice. 540 large and 260 small labels were painted during the year.

Experiments with several kinds of "plant hormones", or growth promoting substances, supplied by Malayan Fertilisers, were carried out. One of those, Seradix B, in powder form, gave excellent results with Bougainvillea cuttings, increasing the percentage of the rooting of difficult kinds from twenty to one hundred per cent; and in the easier kinds, promoting a more rapid production of roots.

A selection of the best standard Hisbiscus has been planted round the sundial terrace on Lawn J, where they can be seen to advantage.

The sale of plants to the public increased considerably during the year, perhaps because of the increased building programmes in Singapore, both

civil and military, which cause a demand for hedging plants and shrubs and trees for permanent planting. As the stocks of new hybrid orchids increase, more became available for sale to local orchid fanciers and to nurserymen. More than 18,000 plants were sold during the year, bringing in a revenue of $9,900. Of this amount sales of orchid plants accounted for $5,500, which represents merely the sale of surplus material, no labour or expenditure being involved beyond that necessary to carry on the routine work of orchid hybridisation and to keep up a sufficient stock for show purposes. It is obvious that with increased staff and equipment orchid sales could be largely increased, but it should be the policy of the Department not to become a business competitor with the nursery gardener, but to do the initial scientific and experimental work and to ensure that the results of that work are passed on to commercial growers.

Orchids

Nine special beds were constructed during the year for the propagation of those types of orchids which thrive in well drained, rich compost. Some twenty-two new hybrids flowered for the first time during 1949, several of them promising to be valuable additions to the range of free flowering and showy orchids already produced. Two hybrids of the terrestrial genus *Spathoglottis* were produced, both very free flowering, one a dwarf plant which has been named *Spathoglottis Dwarf Legion*, with pale lemon or rosy flowers, the other, called *Singapore Giant*, a large, vigorous and apparently perpetually flowering plant with purple flowers. Amongst the Dendrobiums a cross between *D. Helen Park* and *D. Constance* was flowered, which compares favourably with previous hybrids of this alliance. For some years attempts have been made to produce an orchid with both the vigour and the very free flowering characteristics of the well known Vanda Miss Joaquim, but with improved colour and shape of flower. By crossing a Vanda called *V. Nam Kee*, which is the offspring of parents both of which are hybrids, with another which also has two hybrids as parents, seedlings have been produced which have flowered at a very early stage, producing compact heads of large, well-shaped flowers of a good colour. Up to the present about twenty-five seedlings of this cross have flowered, no two exactly the same. It now remains to grow these on, select the finest, and to wait patiently to see whether they will fulfil their early promise.

Succulents

The collection of succulents was added to during the year, efforts being concentrated mainly on increasing the number of the smaller kinds of Cactaceæ, Mesembs, Stapeliaceæ, etc., which take up less room and are more difficult to grow than the larger Cereus, Opuntia, etc. It is interesting to see how well such things as some of the S. African Mesembs do with correct potting, watering and protection from rain, although they seem very reluctant to flower. Only one, a species of *Bergeranthus*, has so far produced flowers. *Gasteria* and *Haworthia*, however, flower quite freely.

Pot Plants

The display of flowering pot plants was moderately good throughout the year, but the foliage plants improved, and a good show of Anthurium, Alocasia, Begonia and Ferns was maintained. A large number of pots of *Saintpaullia*, the so-called African Violent, was raised from seed. The flowers

of this plant are an inch or more across and range from nearly white to deep violet. A selection of the best plants was made for further propagation, which is done simply and easily by means of leaf cuttings.

Seed Exchange

An important aspect of horticultural work in the Gardens is the exchange of seed with other Gardens and scientific institutions. Two men were kept fully employed collecting, preparing, packing and despatching seed in response to numerous requests from all parts of the world. Over 1,800 packets were despatched and some 750 received.

Government House Domain

The Allen motor scythe purchased in 1948 continued to be useful in dealing with areas still to be cleared of lallang and other rough grass.

Beds and lawns throughout the Domain were kept in good condition, and young trees well manured. The tennis court at the Colonial Secretary's house was topdressed twice during the year and continued to give good service. Levelling, digging and regrassing was done at the houses of the Colonial Secretary, the Under Secretary and the Attorney-General.

Much attention was given to the nursery, where some 1,200 to 1,500 pot plants are kept for decorative purposes in Government House. These plants are changed twice a week. *Clerodendron calamitosum* proved to be a useful and popular pot plant. The nursery also provided a considerable quantity of papaya and avocado fruits.

Other Work outside Botanic Gardens

As in former years, advice was given to various Government, Military, civil and private establishments, as well as to the many individuals who call at the Gardens office for information. Planting was carried out at the Telok Paku holiday bungalow, the Telecommunications Station at St. Michael's Road, in the Cathedral compound, at the Government offices and Raffles' Statue in Empress Place and at the Supreme Court. 150 trees were planted at the Cathedral to replace the old ones removed in 1948. A great improvement to the front of the Government offices was made by planting Tecoma, Hibiscus, Frangipanni and Gardenia, all of which have done remarkably well. Royal Palms were planted in front of the Supreme Court. The usual contact with the Municipal Parks Department was maintained, with whom planting material was exchanged.

Botanical Reserves

The three reserves, at Bukit Timah, Woodlands and Pandan were maintained satisfactorily.

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